

## **The Slaved Protein Glass Transition**

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Proteins undergo a dynamic transition at a temperature  $T_{sg}$ . Below  $T_{sg}$ , most protein motions essential for function are "frozen".  $T_{sg}$  is similar to the glass transition of the solvent in which the protein is embedded and we therefore call the transition "slaved". In a 3/1 glycerol-water solvent,  $T_{sg}$  is about 180 K. In a solid environment, such as PVA or trehalose, the transition is absent. A remarkable property of the transition is its insensitivity to the time of observation. It occurs at about the same temperature for motions faster than 100 ps to essentially equilibrium observation. Ultrafast techniques are thus important to study the structural, dynamic, and functional properties of the motions that are involved in the slaved glass transition. A model for the slaved glass transition is based on the hierarchical energy landscape.